

A BRIEF REPORT ON THE MARCH 1982 SAMPLE OF
BARREN-GROUND CARIBOU FROM THE BEVERLY HERD

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SUMMARY

In March 1982, 132 caribou were sampled from the Beverly Herd as it moved past Halliday Lake. Caribou 2 and 3 years old were over-represented in the sample and adult bulls (>3 yr) were under-represented. Condition of the caribou, as measured by weight and fat reserves, was good, compared with average in 1980 and excellent in 1981. The relatively high calf survival in 1981-82 reflects, in part, the excellent condition of the caribou before calving in 1981.

INTRODUCTION

The primary purpose of the March 1982 collection of caribou from the Beverly Herd was to assess the condition of individuals in the herd. Valuable information was also obtained on rumen contents (apparent diet), parasite occurrences and levels, age and sex structure of the segment sampled, age-specific pregnancy rates, the probable period of conceptions and births, and size and morphology of antlers.

Separate from the collection of caribou but related to it, we also obtained information on caribou movements in relation to burns and snow depths, the range types used by caribou in late winter, and the ages and characteristics of range types used by caribou.

What practical benefits are derived from data obtained from the caribou specimens? Data on the condition of the caribou is needed to (1) assess the adequacy of the winter range for the present population of caribou, (2) assess the effects of summer and winter climatic variables on the condition of the caribou, (3) define any relationship between condition and calf survival (with Miller and Gunn). Furthermore, information on diets is needed in order to evaluate the relative value to caribou of various range types and their associated forages at various stages of regeneration after fire. An assessment of the health of the caribou in terms of parasites and diseases is needed to rule out that factor as a significant cause of mortality. The number of warble fly larvae is probably an index of the severity of harassment caused by the fly during the previous July and August. The age and sex structure provides information on relative recruitment in past years and differential mortality between the sexes. Pregnancy rates in each age-class provides an index of environmental conditions and the data is needed to enter into the formulae used to calculate herd size from the results of calving-grounds surveys. The weights and measurements of fetuses provide estimates of dates of conceptions and calving, and they would reflect any problems during the rut caused by unbalanced sex ratios or severe harassment. The antlers are a possible index of condition and they can be used to train observers in the identification of sex and age classes during fall and spring compositional counts.

A sample of the Beverly Herd in March 1982 was necessary in order to maintain the monitoring of the herd's condition which began in March 1980, incidental to forage digestibility trials, and was completed in March 1981. Experience has shown that the ecological relationships of animals can be revealed only with long-term studies. There were other compelling reasons for sampling the herd in late winter 1982. Data on fat reserves were necessary in order to interpret the results of a calf survival study started in May 1981 by Miller (CWS) and Gunn (NWTWS). The counts of warble fly larvae were needed to complement a study on caribou behaviour in relation to insects that was conducted by us in July and August 1981.

This study would not have been possible without the co-operation of several agencies and groups. Aircraft support was provided by NWTWS, Thebacha College (Fort Smith), CWS, and the Fort Smith Hunters and Trappers Association (FSHTA). The FSHTA coordinated the collection, and contributed six hunters, equipment, and camp supplies. Some of the caribou carcasses and samples were returned to Fort Smith on aircraft chartered by DIAND to cache fuel for studies on the "Caribou Range." The collection was truly a co-operative undertaking and its success was due to the efforts of Jim Schaefer, Raymond Beaver, and other members of the FSHTA.

METHODS

A field camp was established at Halliday Lake on 12 March after the main herd was located by Raymond Beaver and Jack Van Camp (Thebacha College), and the Saskatchewan Wildlife Branch. From 13 - 19 March, 132 caribou were obtained by ranging out from the camp on snowmobiles. The caribou were weighed and necropsied at the camp. We obtained information on an additional 7 specimens taken on the same lake by Thebacha College. Some data were also obtained from 7 caribou taken on the lake by a hunter not associated with the project.

RESULTS

1. Composition of the sample (Table 1)

Proportions of caribou approaching 2 and 3 years old were high at 19% and 17%, respectively, and males over 3 years old were under-represented. There was probably a slight bias against shooting calves and towards shooting males over 2 years old. The sex ratio of 1- and 3-year-olds was far from 1:1.

2. Condition statistics (Table 2)

Statistics for weight, back fat depth, and the kidney fat index indicate that in general all 3 measures of condition increase with age to the >3 year age-class and the females had better fat reserves than the males. In all age-groups, males had more warble fly larvae than females and the >3 year group had the fewest larvae.

3. Condition of the Beverly Herd in 1982 vs. 1981 and 1980.

Statistics in Table 2 show sex and age differences but their main value lies in comparisons with other years and other herds. The kidney fat index of females >3 years, for example, showed a sharp jump from March 1980 to March 1981 and then a decrease to an intermediate level in March 1982 (Table 3). The weights paralleled the changes in kidney fat indices.

4. Condition of the Beverly vs. other herds.

The condition of caribou in the Beverly Herd in March 1982 was better than that of the Kaminuriak Herd from 1966-68. A few comparisons of weight are given in Table 4. Depth of back fat averaged 16.2 mm in females >3 years in the Beverly sample compared with 6.4 mm for females aged 3-9 years in the Kaminuriak sample.

5. Pregnancy Rates and Fetal Weights.

Rates were slightly higher (Table 5) than was found in the Kaminuriak Herd in 1966-68 (Table 6). The weights of the fetuses indicate one group centered on a mode of 1200 - 1300 g and another group (6/52) about half the weight. We assume that the smaller group is from a second heat which follows the first by 2-3 weeks.

DISCUSSION

We present in this brief report only a few highlights of the March 1982 collection. The data are preliminary and omit the Thebacha College's sample and the private hunter's sample, and therefore they will change slightly after we obtain ages from tooth sections (now in progress) and add the other 14 caribou. We thought, however, that some initial results and conclusions should be made available now. A detailed report on the sample will be completed by October.

Our preliminary assessment is that caribou in the Beverly Herd were in average condition in March 1980, excellent condition in March 1981 and good condition in March 1982. We believe that the high calf survival in 1981-82 is partly a result of the females being in excellent condition before calving in 1981. We predict lower calf survival in 1982-83 but we must obtain more data on the relationship between condition of the females and calf survival before such predictions can be made with certainty. The picture is complicated by unknown levels of wolf predation and other sources of mortality.

The information on condition analysed to date suggest that the winter range is adequate for the present population size. However, we lack data on condition of the caribou as they enter the winter period. Before final conclusions can be made about the adequacy of the winter range we must obtain information on how much fat and weight is lost from November to March, with due

consideration to snow conditions. A collection of 50 - 75 caribou in November will be adequate to monitor condition because there is little variability in fat reserves within sex and age classes. Twice yearly sampling for 3 years will be necessary to establish the relationships among condition, climate (including fires), the winter range, and calf survival. We will seek to develop simplified techniques of monitoring the condition of the caribou. For example, we found in 1976 while collecting Peary caribou that condition, as well as sex and age, could be obtained from examination of mandibles. Fat content in the mandible was indicative of condition. We will pursue that technique and others in the next 3 years.

Preliminary observations made from 1980-82 of the reactions of caribou to burns of various ages and sizes will be reported by October. Included will be data on range types used in those years, the results of snow measurements and some fire interval information.

The information obtained in 1980 and 1981 on diets and the in vitro digestibility of forages eaten by caribou was necessary before studies of the winter range commenced. The results of analyses of rumen contents of caribou obtained in 1980 and 1981 will be reported separately. The data show the importance of ground lichens in late-winter diets and the minor use of tree lichens. The results of the 1980 study on digestibilities of

forages was published in Arctic and a second paper on the 1981 study is nearly complete.

Studies proposed for winter 1982-82 include samples of 50-75 and 100-150 caribou in November and March, respectively, a study of the movements of caribou in relation to burns and snow, range selection in relation to age and type of forest stand, changes in lichen biomass with time since fire, and other facets of winter ecology with emphasis on the effects of fire.

TABLE 1

Composition of the 1982 sample of barren-ground caribou obtained
13 - 19 March at Halliday Lake, NWT.

Age ^a	Females	Males	Both	% of total
1	13	7	20	15
2	13	12	25	19
3	4	19	23	17
>3	55	9	64	49
Totals	85	47	132	100

^a age in June 1982.

TABLE 2

Sample statistics (mean $\pm$ SE, N) of the 1982 collection of barren-ground caribou obtained 13-19 March at Halliday Lake, NWT

Sex/age	Weight (lb)	Girth (mm)	Back fat depth (mm)	Kidney fat index	No. warble fly larvae
Female 1	94 $\pm$ 2 (13)	90 $\pm$ 1 (13)	1 $\pm$ 0 (13)	33 $\pm$ 5 (9)	137 $\pm$ 23 (23)
Male 1	110 $\pm$ 3 (7)	98 $\pm$ 2 (6)	0 $\pm$ 0 (7)	28 $\pm$ 2 (7)	139 $\pm$ 35 (6)
Female 2	131 $\pm$ 4 (13)	105 $\pm$ 1 (13)	3 $\pm$ 1 (12)	37 $\pm$ 4 (9)	106 $\pm$ 19 (11)
Male 2	147 $\pm$ 5 (12)	108 $\pm$ 9 (12)	1 $\pm$ 1 (11)	39 $\pm$ 3 (9)	148 $\pm$ 28 (9)
Female 3	167 $\pm$ 8 (4)	113 $\pm$ 1 (4)	15 $\pm$ 9 (3)	73 $\pm$ 13 (3)	86 $\pm$ 26 (3)
Male 3	190 $\pm$ 4 (19)	118 $\pm$ 1 (18)	1 $\pm$ 0 (18)	35 $\pm$ 3 (17)	113 $\pm$ 23 (17)
Female >3	184 $\pm$ 2 (55)	115 $\pm$ 1 (54)	17 $\pm$ 1 (53)	61 $\pm$ 3 (51)	38 $\pm$ 7 (52)
Male >3	197 $\pm$ 3 (9)	119 $\pm$ 3 (9)	1 $\pm$ 0 (8)	39 $\pm$ 12 (6)	55 $\pm$ 15 (4)

TABLE 3

Kidney-fat indices and weights of female caribou over 3 years of age obtained in 1980, 1981, and 1982 from the Beverly Herd (mean $\pm$ SE, N)

Year	Kidney Fat Index	Weight (lb)
1980	46.7 $\pm$ 1.8 (13)	177.5 $\pm$ 3.7 (13)
1981	75.4 $\pm$ 7.5 (13)	185.8 $\pm$ 6.5 (5)
1982	60.9 $\pm$ 2.6 (51)	184.1 $\pm$ 2.1 (55)

TABLE 4

Weights of barren-ground caribou obtained from the Beverly Herd in March 1982 and the Kaminuriak Herd in April 1967-68.

Age (yr)	Weight of Males (lb)		Weight of Females (lb)	
	Kaminuriak	Beverly	Kaminuriak	Beverly
1	99	110	88	94
2	132	147	121	131
3	169	190	154	167

^a Dauphiné 1976: CWS Rep. Ser. 38

TABLE 5

Pregnancy rates in females barren-ground caribou collected 13 -
19 March at Halliday Lake, NWT

Age ^a	Total	Pregnant	% Pregnant
2	13	1	8
3	4	3	75
4	8	6	75
>4	47	44	94

^a by wear and eruption criteria.

TABLE 6

Comparative pregnancy rates in the Beverly Herd (March 1982) and the Kaminuriak Herd (1966-68) of barren-ground caribou

Age (yr)	Pregnancy rate (%)	
	Beverly 1982	Kaminuriak 1966-68 ^b
1½ - 2	8 (13) ^c	2 (57)
2½ - 3	75 (4)	48 (69)
3½ - 4	75 (8)	82 (50)
> 4	94 (47)	91 (230)

^a ages for Beverly Herd provisional (based on wear and eruption)

^b Dauphiné 1976:CWS Rep. Ser. 38

^c Sample size